

Section II. REMARKS

Amendment of Claims

Claim 8 has been cancelled herein, and the substance thereof has been incorporated in claim 1 as amended.

Claims 1 and 19 have been amended herein to set forth such claims in better form for consideration and allowance by the Examiner.

Claim 1 has been amended to recite

"at least one thin gasket layer bonded to and fully encapsulating all outer surfaces of said filtration cassette except for said inlet basin, outlet basin and permeate passage openings of said filtration cassette..."

and claim 19 has been amended to recite

"said thin gasket layer fully encapsulates said filtration cassette, except for said inlet basin, outlet basin and permeate passage openings of the filtration cassette, and wherein said thin gasket layer fully encapsulates the filter sheets of said filtration cassette."

Such amendment is consistent with the disclosure in the application, e.g., see FIG. 1 and FIG. 1A, showing inlet basin, outlet basin and permeate passage openings in the gasket and associated cassette; see also FIG. 3 and FIG. 3A; as well as appertaining text in the specification, e.g., at page 17, lines 4-5 ("fully encapsulated by a gasket layer 2").

Rejection of Claims 1, 3-8, 10-13, 16 and 19, and Traversal Thereof

In the August 13, 2003, Office Action, the Examiner rejected claims 1, 3-8, 10-13, 16 and 19 under 35 U.S.C. §103(a) as being unpatentable over Kopf '930 in view of Demmer et al. and/or Karbachsch et al.

Such rejection is traversed in application to claims 1, 3-8, 10-13, 16 and 19 as amended herein.

Reconsideration of the patentability of the amended pending claims is requested, in light of the ensuing remarks.

Patentable Distinction of Amended Claims 1, 3-8, 10-13, 16 and 19 Over the Cited References

In his statement of rejection of the claims at page 2 of the August 13, 2003 Office Action, the Examiner has conceded that Kopf '930 lacks disclosure of the gasketing structure of the present claimed invention, but has pointed to Demmer et al.'s element 3 in FIG. 3 of such reference, and to element 90 in FIG. 2 of Karbachsch et al., as gasket layers, and contended that:

“it would have been obvious to have modified the cassette of Kopf so as to have included the gasket layers bonded onto top and bottom surfaces of the cassette and including openings in the gasket layers communicating with openings of the cassette as suggested by Demmer et al and Karbachsch et al in order to facilitate assembly of the cassette with adjacent structure” (page 2, August 13, 2003 Office Action)

Applicant vigorously disagrees and requests reconsideration of the claims as amended, based on the following patentable distinction of such claims over the cited references.

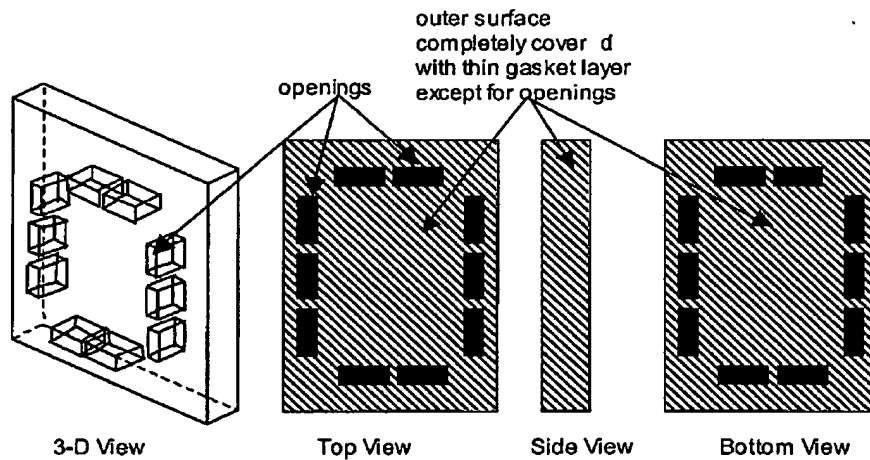
Independent claims 1 and 19, as amended herein, require the filtration cassette to be fully encapsulated by a thin gasket layer except for the inlet basin, outlet basin and permeate passage openings of the filtration cassette.

Claim 1 as amended herein requires:

“at least one thin gasket layer bonded to and fully encapsulating all outer surfaces of said filtration cassette except for said inlet basin, outlet basin and permeate passage openings of said filtration cassette so that said thin gasket layer forms an integral unitary structure with said filtration cassette...”

(claim 1, as amended)

Thus, the thin gasket layer covers all surface areas of the cassette, as shown below:



The far left hand drawing is a three-dimensional view of the integral gasketed filtration cassette structure, including a thin gasket layer completely covering the cassette except for the openings (indicated by rectangular boxes). To the right of the three-dimensional view, are top, side and bottom views of the integral gasketed filtration cassette. These views show how the thin gasket layer (indicated as striped medium) completely encapsulates all outer surfaces of the filtration cassette, except for the inlet basin, outlet basin or permeate passage openings.

By contrast, the prior art fails to teach the encapsulation of all outer surfaces of a filtration cassette. Demmer et al. and/or Karbachsch et al. disclose sealing rings that are used for sealing only the edge regions of a filtration assembly, and that contact only part of the top and bottom surfaces of a filtration assembly.

In both of Demmer et al. and Karbachsch et al., there are outer surfaces of the filtration assembly that are not encapsulated with the sealing ring.

Thus, Kopf fails to disclose a thin gasket layer encapsulating all outer surfaces of the filtration cassette, and the combination of the Kopf cassette with the peripheral surface sealing rings of Demmer and/or Karbachsch does not in any way yield a filter article in which all outer surfaces of the filtration cassette are encapsulated.

The cited combination of reference teachings therefore does not in any way equate to, extrapolate to, or implicate applicant's invention as claimed.

Demmer et al. does not disclose any thin gasket layer that fully encapsulates all outer surfaces of the filtration cassette.

Concerning the Examiner's citation of element 3 of FIG. 3 in Demmer et al., the Examiner's attention is directed to FIG. 8 of such reference, as showing a more detailed rendering of the structure shown in FIG. 3.

For ease of reference, the FIG. 8 drawing of Demmer et al. is reproduced on the following page.

Demmer et al.'s FIG. 8 shows a grate with an elastic sealant on its edges, and the illustrated structure of this FIG. 8 of Demmer et al. clearly shows that all outer surfaces of this grate are NOT encapsulated by a thin gasket layer, but rather only the peripheral region of the filtration assembly.

Fig. 8 3-D view of dead-end filtration unit

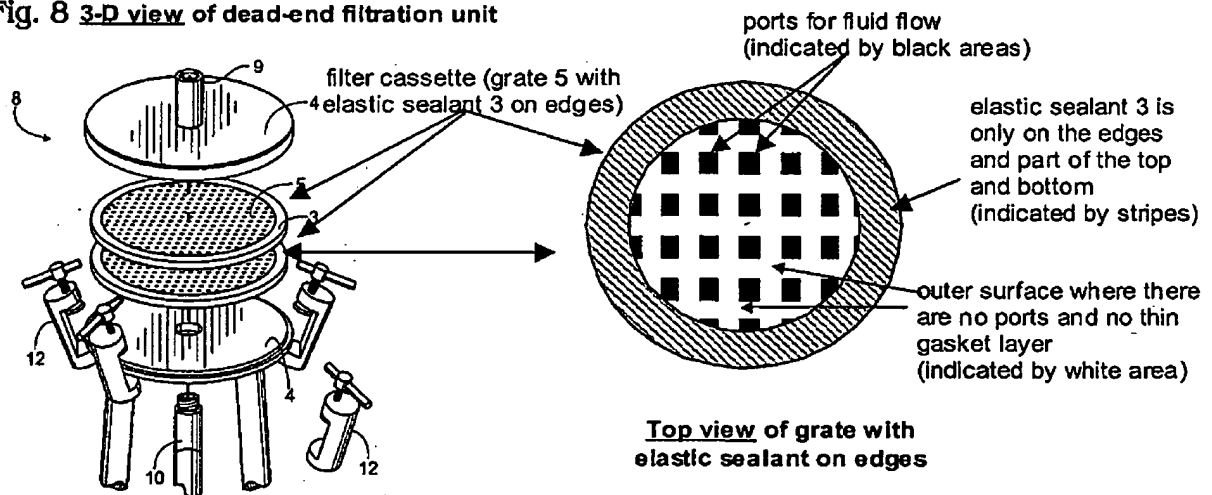


Figure 8 of Demmer et al. is shown on the left, and a top view of the grate of FIG. 8, with only the peripheral edges sealed, is shown on the right.

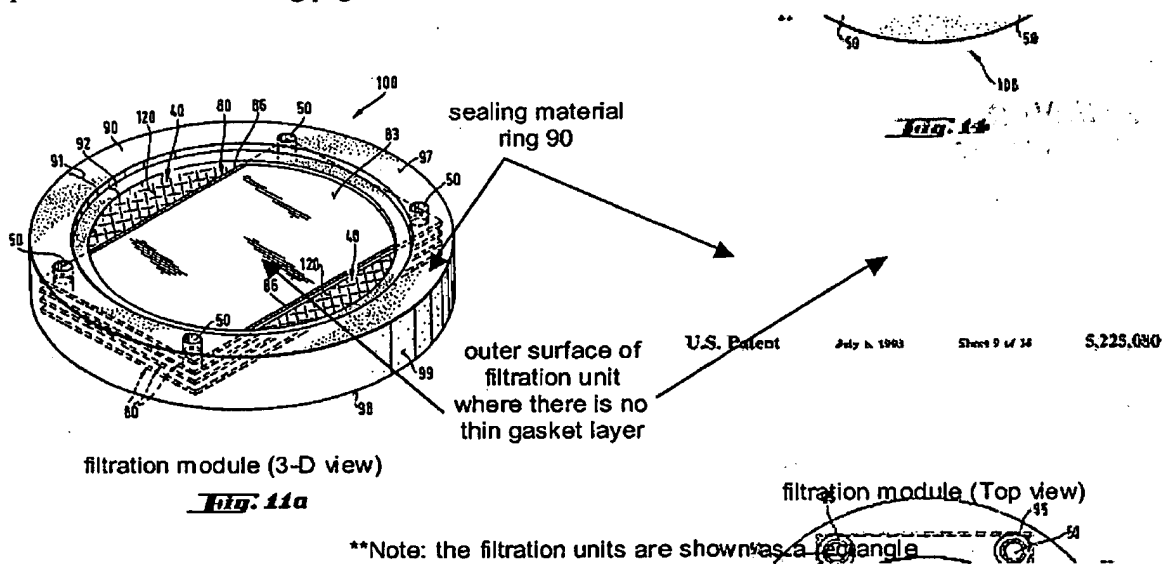
As shown in the right-hand drawing reflecting the disclosure of Demmer et al., the entire outer surface of the grate (indicated in the drawing by the white area) is not covered or encapsulated with a thin gasket layer.

Only the edges and associated peripheral regions of the top and bottom surfaces of Demmer et al.'s grate have an elastic sealant thereon (indicated as striped medium in the drawing).

Demmer et al. thus fails to disclose or suggest the full encapsulation structure of applicant's claimed invention, and the combination of Kopf and Demmer et al. correspondingly provides no derivative basis for applicant's claimed invention.

Karbachsch et al. likewise only seals the edges and associated periphery of the top and bottom surfaces of a filtration module with a sealing material ring.

Karbachsch et al. contains no teaching or suggestion of fully encapsulating all outer surfaces of the filtration module. This deficiency is clear from FIGS. 11a and 14 of Karbachsch et al. as reproduced on the following page for ease of reference.



All of the outer surfaces of Karbachsch et al.'s filtration unit (shown by the rectangular shape) are not covered by a thin gasket layer.

In fact, the vast majority of the top and bottom surfaces of this rectangular filtration unit is devoid of any covering, gasket, or protective medium - only the extreme edge regions of the top and bottom surfaces of this unit have an elastic sealant applied thereto.

Thus, the combination of Kopf and Karbachsch et al. could not possibly yield the fully encapsulated cassette structure of applicant's claimed invention.

Additionally, the combination of Kopf and Demmer et al. and/or Karbachsch et al. does not realize and in no way suggests the advantage of applicant's claimed invention.

Applicant is concerned with minimizing misalignment of gasket sheets during operation and installation, which may generate an uneven edge that blocks the entry-exit port(s) for fluids and/or leaves a leaking gap.

Demmer et al. and Karbachsch et al. are concerned with sealing the edges of a filtration assembly.

Neither of these secondary references discloses the provision of a thin gasket layer over the entire faces of the filtration module for the purpose of avoiding misalignment issues such as are associated with the use of conventional separate gasket elements.

Further, even apart from the foregoing, which alone is a compelling rebuttal of the rejection, there is no logical basis for the combination of Demmer et al. and/or Karbachsch et al. with Kopf.

Kopf discloses a cross-flow filtration apparatus - see Kopf at column 1, lines 25-27:

"The invention [of the Kopf reference] further relates generally to cross-flow filters comprising a multiplicity of stacked filtration cassettes"

(emphasis added; Kopf, column 1, lines 25-27)

Consistent with the cross-flow character of the Kopf filtration apparatus, Kopf describes an assembly that is schematically shown in side elevation (exploded) view in FIG. 18 of the patent, as reproduced on the following page for ease of reference, wherein I is the inlet of the filtration apparatus, O is the outlet for filtered retentate, PT is the permeate port from which collected permeate is discharged from the filter assembly. In such assembly, G₁ and G₂ are the gaskets and FC is the filtration cassette.

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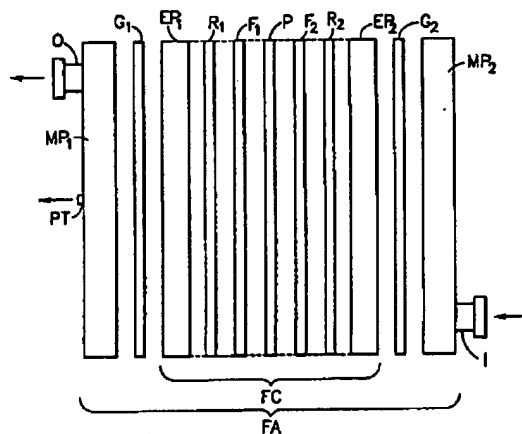


FIG.18

This cross-flow filtration assembly of Kopf, wherein the separate element gaskets G_1 and G_2 are on the respective end faces of the filter cassette, is to be contrasted with the dead-end filtration unit of Demmer et al. as shown on the following page.

U.S. Patent Apr. 8, 1997 Sheet 3 of 4 5,618,418

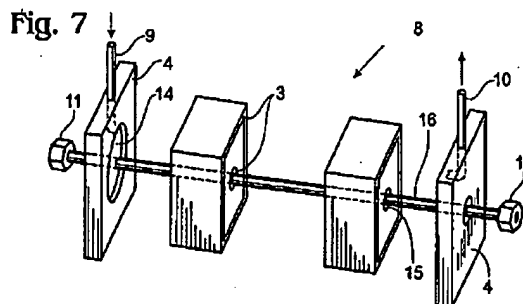
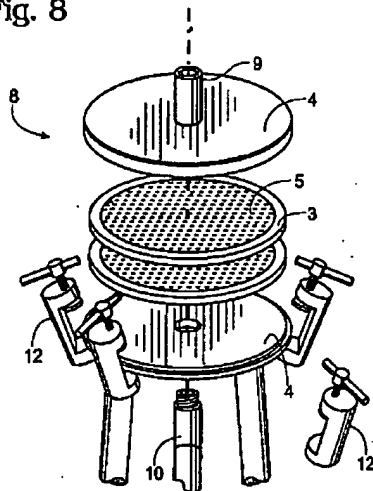


Fig. 8



FIGS. 7 and 8 of Demmer et al. are reproduced above for ease of reference, wherein the outer edges of the membrane filter sections 2 are sealed with an elastic sealant 3.

In contrast to the Kopf filtration apparatus, wherein the end faces of the cassette are adjacent to gasket elements, the filter sections 2 of Demmer et al. CANNOT be faced with gaskets since the faces must remain open to the dead-end flow therethrough. There are no permeate/retentate flows out of the filtration unit of Demmer et al. - there is only feed in one end and permeate freed from separated substances out the other end (see Demmer et al., at column 4, lines 30-46). The separated material remains in and collects on the filter elements, so that the filtration unit must be selectively desorbed and eluted, as described at column 4, line 41, or else

the filtration unit must be "opened" and "the filter cassettes removed" as described at column 4, lines 42-43 of Demmer et al.

Thus, Kopf seals the faces of the cassette. Demmer et al. seals only the peripheral edges. Kopf is a cross-flow filter. Demmer is a dead-end filter. There is therefore no logical derivative basis for the present invention in the teachings of Kopf and Demmer et al.

Alternatively, the Examiner has proposed to combine Kopf with Karbachsch et al. The sense of this combination is not understood, since again Karbachsch et al. is a different filter configuration from that of Kopf. Karbachsch et al. discloses an annular sealing ring that circumscribes a stacked filter unit assembly, as shown for example in FIG. 11a of such reference, reproduced for ease of reference below.

U.S. Patent July 6, 1993 Sheet 5 of 14 5,225,080

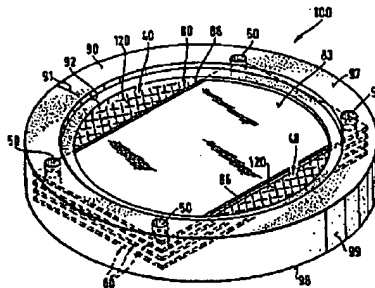


Fig. 11a

The Karbachsch et al. filtration module uses the annular sealing ring to form the "unfiltered material channels 40" (column 11, lines 20-21 of Karbachsch) as open areas between the inner surface of the annular sealing ring 90 and "the peripheral sections which are not embedded in the sealing ring 90" (column 10, lines 64-65 of Karbachsch).

The stack of membranes 83 in Karbachsch et al. is only contacted with the annular sealing ring at the corners of the stack.

The Karbachsch filtration module structure therefore is inconsistent with, and fundamentally different from, the filtration apparatus of Kopf. Kopf features gasket elements adjacent the end faces of the filter cassette. Karbachsch leaves such faces almost totally exposed (except for the corners embedded in the annular sealing ring 90).

It is clear that there is no derivative basis in either Demmer et al. or Karbachsch et al. for applicant's invention as claimed.

There is no basis in the Kopf patent or the secondary references of Demmer et al. and Karbachsch et al. for modifying the Kopf filtration apparatus in the manner hypothesized by the Examiner, and there are numerous reasons why one of skill in the art would reject such modification - as increasing the cost, manufacturing time requirement, and complexity of the filtration apparatus, in addition to the clear and unambiguous teaching by Kopf that

"The gasket 600 permits a "hard shell" filtration cassette, i.e., a filtration cassette comprising an outermost rigid endplate, to be efficiently sealingly mated to a manifold plate of a filter comprising the filtration cassette." (emphasis added; column 23, lines 10-13 of Kopf).

Kopf therefore teaches away from any integral gasketing approach, since he teaches that the separate and non-integral gasket element is an efficient sealing means - why then would one seek to modify the Kopf approach, when it is taught as being efficient, and discard the separate gasket element in favor of an approach requiring substantially more sealing material, processing fabrication time and effort?

The absence of any tenable answer underscores the patentable distinction of the applicant's claimed invention over the art.

Claim 1 is patentably distinguished over the cited combination of references, as are dependent claims 3-7, 10-13 and 16 thereunder.

Claim 19 is patentably distinguished over the cited references on corresponding grounds (claim 19 reciting that the gasket layer "fully encapsulates said filtration cassette except for said inlet basin, outlet basin and permeate passage openings of the filtration cassette, and wherein said thin gasket layer fully encapsulates the filter sheets of said filtration cassette").

In addition to the arguments for patentability presented herein, applicant reaffirms the distinguishing remarks of record presented in the March 26, 2003 response, as further showing the patentable character of the invention as claimed.


The Examiner therefore is requested to reconsider, and on reconsideration to allow, the pending claims 1, 3-7, 10-13, 16 and 19, as herein amended.

CONCLUSION

Claims 1, 3-7, 10-13, 16 and 19 as amended herein, are now in form and condition for allowance. Favorable action therefore is requested.

If any issues remain outstanding, incident to the formal allowance of this application, the Examiner is requested to contact the undersigned attorney at (919) 419-9350 to discuss their resolution, in order that this application may be passed to issue at an early date.

Respectfully submitted,



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